Engineered mitochondrial ferritin as a magnetic resonance imaging reporter in mouse olfactory epithelium.

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Public Summary:
We report the design of a MRI reporter gene with applications to non-invasive molecular imaging. We modified mitochondrial ferritin to localize to the cell cytoplasm. We confirmed the efficient cellular processing of this engineered protein and demonstrated high iron loading in mammalian cells. The reporter's intracellular localization appears as distinct clusters that deliver robust MRI contrast. We used this new reporter to image in vivo and ex vivo the gene expression in native olfactory sensory neurons in the mouse epithelium. This robust MRI reporter can facilitate the study of the molecular mechanisms of olfaction and to monitor intranasal gene therapy delivery, as well as a wide range of cell tracking and gene expression studies in living subjects.

Scientific Abstract:
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